

### **Abstract**

An electro-optic modulator is formed on a silicon-on-insulator (SOI) rib waveguide. An optical field in the modulator is confined by using an electrically modulated microcavity. The microcavity has reflectors on each side. In one embodiment, a planar Fabry-Perot microcavity is used with deep Si/SiO<sub>2</sub> Bragg reflectors. Carriers may be laterally confined in the microcavity region by employing deep etched lateral trenches. The refractive index of the microcavity is varied by using the free-carrier dispersion effect produced by a p-i-n diode formed about the microcavity. In one embodiment, the modulator confines both optical field and charge carriers in a micron-size region.